THE OPTIMAL AMOUNT OF VERTICAL JUMP TRIALS NECESSARY TO YEILD THE HIGHEST JUMPING PERFORMANCE

T. Faust, A. Bosak, G.Toms, and J. Obretkovich. Liberty University, Lynchburg, VA 24515.

ABSTRACT

The vertical jump is a power assessment test commonly used in various athletic settings to analyze an athlete's performance often related to their sport such as hockey, basketball, etc. The vertical jump allows a simple, easy, and cost-effective option to evaluate an athlete's lower body power. When reviewing the research literature involving the use of the vertical jump test, a vast majority of research studies suggest that two to three trial attempts were completed by each subject. However, to the best of our knowledge, no study has determined if two to three trials is a sufficient amount of trials necessary to elicit a true peak (ie. the highest jump possible, with no further improvement occurring with successive trials) in vertical jump performance. **PURPOSE:** To determine the optimal amount of countermovement jumps that would produce the highest jump possible in collegiate hockey players. **METHODS:** Thirty-one male collegiate ice hockey players participated in the study. The subjects had their height, weight, and body fat percentage recorded and then completed a dynamic warmup before the highest standing reach height, via a Vertec vertical jump tester, was recorded for each subject. Subjects were then allowed as many vertical jump attempts as possible to reach their max until there jumping performance remained the same or decreased for three consecutive trials. The mean number of vertical jumps, with respective standard deviations, were assessed using SPSS software. **RESULTS:** The mean jump results (76.55 ± 6.68 cm) suggest athletes should be given a minimum of five (± 1.84) vertical jump trials to reach their true max. By the fifth attempt, a cumulative percentage of 61.3% of the individuals had reached their max height. However, according to the cumulative percentage it is strongly encouraged athletes be given at least six trials as the cumulative percentage increases to 87.1% with the inclusion of an extra trial. **CONCLUSION:** When assessing an athlete's vertical jump performance, it is recommended to allow at least five to six maximal attempts for the athletes to elicit their true peak. **PRACTICAL APPLICATION:** The inclusion of more trials is necessary in jumping performance assessment considering many training program decisions are made based upon an athlete's peak performance. The current study's results suggest that if only two to three trials were utilized, the athletes would have had their jumping performance underestimated with their true peak jumping height being unrecorded. The results of this study may assist coaches and practitioners in obtaining true peak jumping values for their athletes by increasing the number of jump trials that athletes complete.

INTRODUCTION

The vertical jump test (VJ) is commonly used to not only assess athletes lower body power, but to also give incite into monitoring the athletes load. Previous research suggests the VJ can predict on ice skate speed in male hockey players and should be used in their talent evaluation process (Beltz,2015). The goal of performance testing athletes is to get the most reliable and accurate measurement for the variable of interest for that day. This allows coaches and practitioners the best opportunity to set their athletes up for successful performance in their sport. In reviewing the literature, coaches and practitioners prescribe 2-3 trials for each athlete per vertical jump assessment. However, to the best of our knowledge, no prior research study has examined if athletes reach peak performance within these prescribed trials.

PURPOSE

To determine the optimal amount of countermovement jumps that would elicit peak jumping performance.

METHODS

Thirty-one male Liberty University club sport hockey players from division's I, II, and III (mean ± SD; age 21.9 ± 1.5 years; height 181 ± 4.8 cm; weight 83.8 ± 9.0 kg; body fat percentage 13.5 ± 5.7; strength training experience 7.5 ± 3.0 years; years of sport experience 16.1 ± 3.2) participated in this study. To participate, individuals had to be current players on one of the three Liberty University men's hockey teams. The subjects were healthy and reported no significant lower body injuries in the past six months. Subjects reported to the laboratory to complete informed consent and risk stratification paperwork and then had anthropometric data collected. Subjects were then lead through a five-minute dynamic warmup. Vertical jump height (in centimeters) was assessed through a Vertec measurement system. Subjects had their max standing reach height recorded. Subjects then completed as many trials as needed to reach their maximal height. After a subject had performed three trials of not reaching any higher heights or remaining the same, the testing session was concluded. A rest period of thirty seconds was given between each jump for all subjects. Descriptive statistics, which included means and standard deviations, were calculated for age, height, weight, body fat percentage, hockey experience, strength training experience, average vertical height, max vertical height, and trial peak number. All statistical analysis was calculated using SPSS software.

RESULTS

The distribution of subjects and exactly what number vertical jump trial they reached their peak jump height is shown in Figure 1. The mean for trial peak number was 5 ± 1.8. Table 1 displays evaluation of the data through the valid and cumulative percentage. Table 1 illustrates, in a practical way, why the inclusion of potential extra trials would be beneficial to our athletes.

CONCLUSION

Strength coaches and practitioners utilize the vertical jump as a lower body power assessment tool. In prior research using ice hockey players, individuals' vertical jump height had shown relationships with their forward and backward acceleration speed as well as their flying 50ft top speed test (Runner et al., 2016). In the current study, six subjects peaked at trial number five accounting for 19.4% and a cumulative percentage of 61.3%. Having the athletes only jump five trials would still leave some athletes without their true value. Eight of the 31 subjects peaked during their sixth trial. This accounted for 25.8% of the subjects and 87.1% of the cumulative percentage. The main novel finding of the current study was that athletes should at least be allowed six attempts during the assessment of their vertical jump max. This will more than likely ensure that coaches and practitioners receive a reliable, valid, and most accurate jump height measurement.

PRACTICAL APPLICATION

Having the vertical jump test in a coach's battery of assessment tests allows the strength coach to evaluate the impact of previous programming and make modifications with future programming. Strength coaches who use the Vertec to test vertical jump should have their athletes do a minimum of six trials. Future research involving the VJ test should consider implementing the current study's results, specifically pertaining to the number of allowed jumps. Further research should focus on how other assessment tests, such as the broad jump, can be impacted by the allowance for more trials.

Optimal Number of Vertical Jump Trials

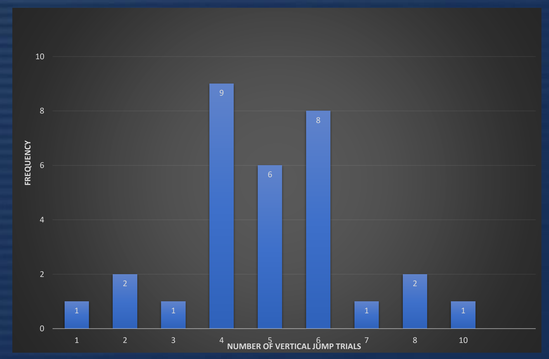

Figure 1

Trial Peak Number

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	3.2	3.2	3.2
	2	2	6.5	6.5	9.7
	3	1	3.2	3.2	12.9
	4	9	29.0	29.0	41.9
	5	6	19.4	19.4	61.3
	6	8	25.8	25.8	87.1
	7	1	3.2	3.2	90.3
	8	2	6.5	6.5	96.8
	10	1	3.2	3.2	100.0
	Total	31	100.0	100.0	

Table 1

REFERENCES

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